

The prices for each vendor are grouped according to those applicable to end offices, remote switches and tandem switches.¹⁰ End office prices are charges for switch replacements, growth in switching systems, the placement of entirely new switches and the buyout of previously placed capacity.

In the case of a switch replacement, the pricing structure varies considerably among the three vendors. SICAT accounts for these differences in calculating line, trunk and usage investments.

Vendor A replacement line charges cover all replacement switch hardware - line and trunk peripherals, the switch matrix, processors and memory, etc. Three different line prices are provided for the different usage levels. Vendor A replacement costs are incurred for both analog and digital lines.

A price is shown for a trunk on a replacement switch, although trunks are already covered by the line price. The trunk price is used in SICAT to remove the trunk costs implicit in the line price so that trunk costs can be separately identified. Line termination and trunk access are two different switching functions.

Prices per line also are provided for replacement and conversion services provided by Vendor A. These services are described in Section 3.1.1.

Vendor B has single analog line and digital line charges for replacement switches. As with Vendor A, the line price covers line termination, usage and trunks. Since Vendor B does not provide a trunk price for replacement switches, SICAT uses the price for growth trunks to remove the implicit trunk costs covered by the line price.

To identify the switch costs for usage or CCS, SICAT takes a different approach for Vendor B switches. When lines are expected to have higher usage, Vendor B engineers and places additional switch ports to increase the call handling capacity of the switch. Prices for each port are provided for Vendor B end offices and hosts. These are shown at the bottom of the Vendor B price list. The prices are used in the CCS investment spreadsheet to measure CCS investment.

Vendor C pricing for replacement and new switches is quite different from the other two vendors. Vendor C offers its first seven replacement and new switches at a nominal price. This pricing provides for approximately 75 thousand lines of switch capacity, and covers line terminations, usage, and trunks. Vendor C provides another fifty thousand lines of replacement or new switching capacity at no charge. Beyond this, a price per analog line applies. There is no separate charge for replacement or new digital lines.

The next group of vendor prices is for growth additions to existing digital switches.

¹⁰ SBC's current vendor contracts are referred to as Digital Network Deployment (DND) contracts.

Vendor A provides prices for analog lines (at three usage levels) and trunks. In addition, a price is included for the Integrated Digital Carrier Unit (IDCU), used to terminate digital lines in the switching system.¹¹ The IDCU price is for a DS1 channel termination.

Vendor B also has charges for growth analog lines and trunks, but its pricing for digital lines is different from *Vendor A*. As described in Section 3.1.1, there are two options available for providing digital lines – one using ESMA and the other SMSs. The first ESMA price applies until SBC purchases a certain number of units. After this, a lower ESMA price applies. ESMA is capable of terminating 1,920 digital lines. For the SMS option, a single price applies for all units purchased. A SMS terminates 24 digital lines. These prices are used to develop an average price per digital line.

Vendor C simply has charges for growth analog lines, digital lines, and trunks. The digital line and trunk prices are per DS1.

New line prices apply to new digital switching systems. New lines can be either analog or digital.

Vendor A price elements are the same as before, except there is an additional base charge of \$000,000 for each new switch purchased. This price is applied to the forecast of new switches during the planning period.

Vendor B has different analog line prices depending on whether the new switch has less than or greater than 10,240 lines. Smaller switching systems carry a higher line price. Demand forecasts for *Vendor B* new switch lines are separated between those terminated on switches with less than or greater than 10,240 lines. *Vendor B* has only one digital line price for new switching systems. The price does not vary with the number of digital lines.

Vendor C pricing structure for new lines is the same as replacement lines.

Buyout lines and trunks represent capacity that is currently installed, but not yet activated or purchased. Forecasts of buyout lines and trunks to be activated are included in the Input – Demand spreadsheets. Applicable prices for these capacity buyouts are entered in the EF&I Price spreadsheets. All buyout prices are expressed on a per line or trunk basis.

Following the end office pricing are prices for remote switches. Typically, remote switches are located in rural areas of SBC territory where populations remain constant over time. Remote switches generally do not grow for this reason. Consequently, vendor

¹¹ An IDCU enables digital access channels to be terminated directly on the switching system without conversion to analog signals. The IDCU terminates a DS1 channel with the capacity for 24 DS0, voice grade channels or access lines.

contracts contain prices for new remote switches, while end office replacement and growth prices are used as surrogates.

Vendor A's Exit Message (EXM) remote switch has a base price of \$000,000 or a per line price of \$00.00, whichever is greater. SBC did not forecast any new Vendor A remotes at the time the current contracts were negotiated.

Vendor B's Remote Switching Center - S (RSCS) is the current remote switch provided to SBC. It comes as either a single or dual RSCS, where the dual RSCS is capable of supporting a greater number of umbilical trunks between the remote and host office. The base prices for the single and dual RSCS are \$000,000 and \$000,000, respectively. SBC also did not forecast any new Vendor B RSCSs at the time the current contracts were negotiated.

SBC does not plan to purchase *Vendor C* remote switches at this time; therefore, no prices are required by SICAT for Vendor C remote switches.

Note that remote switch prices cover line terminations and switch usage. The trunks between remotes and host switches are part of the end office investment.

Vendor pricing for tandem trunks is provided for Vendor A and Vendor B. SBC does not acquire tandem switches from Vendor C. All tandem trunk prices are expressed at the DS0-level.

At the end of each vendor price list are one or more miscellaneous price elements. These are charges identified in the various vendor contracts, agreement letters and amendments.

Vendor A pricing includes a one-time right-to-use fee for capitalized feature software costs expected in the second year of the planning period. These costs are used in the calculation of the Vendor A feature costs per line. See Section 4.1.6.

Vendor B also has several other miscellaneous price elements. Installed base hardware includes items that will be purchased to upgrade the switching network. These items are included in the network upgrade costs. Remote conversions are costs for converting older remote switches to single or dual RSCSs. Additional software charges are per-line charges for software, which is expensed. SICAT does not include these costs for this reason. The ports per umbilical prices are used in computing the incremental cost of switch usage.

Vendor C's other miscellaneous elements include capitalized RTU fees, which are included in SICAT's costs. The vendor has provided the CCS price per line at the next increment of capacity for analog and digital lines. These items are used in computing the incremental cost of switch usage. See Section 4.2.

3.1.3 Input-Upgrade Costs

Over the planning period, SBC will incur substantial costs to upgrade switching system hardware and software. This is to maintain their call processing capabilities. These costs are not based on unit prices applied to line and trunk volumes. Instead, they are quarterly or annual charges. The capitalized costs of network upgrades and software are provided in the spreadsheet Input – Upgrade Costs, which is illustrated in Figure 3.3.

Note that several of the upgrade costs are aggregate annual amounts. Others, such as Vendor A remote upgrades and Vendor B ENET upgrades, have charges per switch, which are applied to the number of upgrades to be performed each year of the planning period.

Since upgrade costs are shared by both lines in service at the beginning of the planning period and line additions, SICAT assigns a portion to each. In addition, the portion of upgrade line costs assigned to line additions is further divided among lines, trunks, usage, and features. Each of the unit investments calculated by SICAT includes a portion of these costs. The bills of costs for each switching component separately identify upgrade costs.

Following is a general description of the network upgrades and software. For more information, refer to the various vendor agreements listed in Appendix A.

Vendor A

- *IIIC2 - 3B21, CM1/2 & DLN30 Hardware* is for upgrades to the hardware and software associated with 3B21, CM1, and DLN30 switch equipment. Similarly, *IIIC1 – Peripheral Processor Hardware* is for upgrades to peripheral processor equipment.
- *IIIB – Generic Hardware* is for upgrades to generic gating hardware that is associated with generic software issued during the contract term.
- *IVB1 – Generic Operating Software Upgrades and Application Software Upgrades* are for upgrades to switch operating system software and application software.
- *Remote Upgrades* are upgrades to remote switching systems.
- *DLN30 Software Licenses* are fees paid to utilize software associated with DLN30 processors.
- *SNET Technology Upgrades* are for peripheral and infrastructure upgrades in the Southern New England Telephone region. *SNET Generic Hardware Upgrades* are similar hardware upgrades.
- *AIT Generic Hardware Upgrades* are hardware upgrades to be performed in the Ameritech region.
- *Discounts* are credits applied to the purchase of hardware.

Figure 3.3

Microsoft Excel - SICAT - ABC - Vendor Generic 10.16.01

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Input - Network Upgrade and Software Costs

Vendor A

Network Upgrade or Software Item	Resource Driver	EF&I Price	Contract Year Quantity					Total Cost				
			1	2	3	4	5	1	2	3	4	5
BC2 - Processor (3821), Communication Module (CM12) & Data Link Node (DLN30) Hardware	Lot							\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
BC1 - Peripheral Processor Hardware	Lot							\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
VB - Generic Hardware	Lot							\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
VB1 - Generic Operating Software Upgrades	Lot							\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
VB1 - Generic Application Software Upgrades	Lot							\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
Southern New England Technology Upgrades	Lot							\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
Data Link Node (DLN30) Software Licenses	Lot							\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
Discounts	Lot							\$ (100,000)	\$ (100,000)	\$ (100,000)	\$ (100,000)	\$ (100,000)
Remote Upgrades	Each	\$ 50,000	-	-	-	-	-					
Southern New England Generic Hardware Upgrades	Lot							\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
Ameritech Generic Hardware Upgrades	Lot							\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000

Vendor B

Resource	Resource Driver	EF&I Price	Contract Year Quantity					Total Cost				
			1	2	3	4	5	1	2	3	4	5
Baseline Software I - Generic Software	Lot							\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000
Baseline Software I - Feature Software	Lot							\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000
Baseline Software II	Lot							\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000
Service Ready	Lot							\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000
SuperNode Peripheral Module (SPM) spare	Each	\$ 100,000	20	20	20	20	20					
SuperNode Data Manager (SDM) 4MB base	Each	\$ 100,000	20	20	20	20	20					
SuperNode Data Manager (SDM) 8MB upgrade	Each	\$ 100,000	20	20	20	20	20					
Enhanced Network (ENET) upgrade	Each	\$ 100,000	20	20	20	20	20					
Remote Line Concentrating Module (RLCM) to RSC-S	Each	\$ 100,000	20	20	20	20	20					
Remote Switching Center (RSC) to RSC-S	Each	\$ 100,000	20	20	20	20	20					
Remote Line Concentrating Module (RLCM) to Dual RSC-S	Each	\$ 100,000	20	20	20	20	20					
Dual Remote Switching Center (RSC) to Dual RSC-S	Each	\$ 100,000	20	20	20	20	20					
Discounts	Lot							\$ (10,000)	\$ (10,000)	\$ (10,000)	\$ (10,000)	\$ (10,000)

Vendor C

Resource	Resource Driver	EF&I Price	Contract Year Quantity					Total Cost				
			1	2	3	4	5	1	2	3	4	5
Network upgrades												
113C processors	Each	\$ 100,000	10	10	10	10	10					
Switching network configuration	Each	\$ 100,000	10	10	10	10	10					
Right-to-use	Lot											
Capitalized right-to-use fees	Lines											

Input - Upgrade Costs

Vendor B

- *Baseline Software I* is for the purchase of generic software loads LEC002 – LEC017 in the Southwestern Bell and Pacific Bell regions.
- *Baseline Software II* is for the purchase of incremental software for loading NA008- NA012 for the entire SBC territory.
- *Service Ready* elements include core processors, memory cards, PCL gating hardware, engineering start-ups, installation start-ups, load insertions, technical support, software maintenance and query tool (SMQT) and documentation.
- *SPM spare* is spare capacity for SuperNode Peripheral Modules.
- *SDMs 4MB base* are SuperNode Data Manager equipment with 4MB of memory.
- *SDMs 8MB upgrade* is an upgrade to the SDM 4MB base, which increases the memory capacity to 8MB.
- *ENET upgrade* is an upgrade to the Enhanced Network.
- *RLCM to RSC-S conversion* is an upgrade from a Remote Line Concentrating Module to a Remote Switching Center-S.
- *RSC to RSC-C conversion* is an upgrade from a Remote Switching Center to a Remote Switching Center-C.
- *RLCM to dual RSC-S conversion* is an upgrade from a Remote Line Concentrating Module to a dual Remote Switching Center-S.
- *Dual RSC to dual RSC-S conversion* is an upgrade from a dual Remote Switching Center to a dual Remote Switching Center-S.
- *Discounts* are credits applied to the purchase of hardware.

Vendor C

- *113C Processors* are upgrades to host office processors.
- *Upgrades to Switching Networks* are generic hardware and software upgrades.

3.1.4 Input-Demand

SICAT requires demand forecasts for lines, trunks and other volumes that determine switch capacity additions and costs over the five-year planning period. The planning period is assumed to begin on *****. Figures 3.4, 3.5 and 3.6 illustrate demand data required for Vendor A, Vendor B and Vendor C.

Figure 3.4

Microsoft Excel - SICAT - ABC 3.0 Vendor Generic 10/16/01

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Input - Vendor A Demand Forecast

Item	Contract Year Quantities				
	1	2	3	4	5
End office switches					
Analog replacements (AESS-R) - lines					
Southwestern Bell Telephone	25,000	25,000	25,000	25,000	25,000
Pacific Bell	25,000	25,000	25,000	25,000	25,000
Nevada Bell	25,000	25,000	25,000	25,000	25,000
Southern New England Telephone	25,000	25,000	25,000	25,000	25,000
Ameritech	25,000	25,000	25,000	25,000	25,000
Growth of existing offices					
Lines					
Southwestern Bell Telephone	25,000	25,000	25,000	25,000	25,000
Pacific Bell	25,000	25,000	25,000	25,000	25,000
Nevada Bell	25,000	25,000	25,000	25,000	25,000
Southern New England Telephone	25,000	25,000	25,000	25,000	25,000
Ameritech	25,000	25,000	25,000	25,000	25,000
Trunks					
Southwestern Bell Telephone	25,000	25,000	25,000	25,000	25,000
Pacific Bell	25,000	25,000	25,000	25,000	25,000
Nevada Bell	25,000	25,000	25,000	25,000	25,000
Southern New England Telephone	25,000	25,000	25,000	25,000	25,000
Ameritech	25,000	25,000	25,000	25,000	25,000
New end offices					
Switches					
Southwestern Bell Telephone	-	-	1	-	-
Pacific Bell	-	-	1	-	-
Nevada Bell	-	-	1	-	-
Southern New England Telephone	-	-	1	-	-
Ameritech	-	-	1	-	-
Lines					
Southwestern Bell Telephone	-	-	35,000	-	-
Pacific Bell	-	-	35,000	-	-
Nevada Bell	-	-	35,000	-	-
Southern New England Telephone	-	-	35,000	-	-
Ameritech	-	-	35,000	-	-
Buyout lines - SBC Total					
Analog lines	-	-	25,000	-	-
Digital lines	-	-	25,000	-	-
Digital trunks	-	-	25,000	-	-

Item	Contract Year Quantities				
	1	2	3	4	5
Remote switches					
Growth lines					
Southwestern Bell Telephone	-	-	-	-	-
Pacific Bell	-	-	-	-	-
Nevada Bell	-	-	-	-	-
Southern New England Telephone	-	-	-	-	-
Ameritech	-	-	-	-	-
New switches					
Southwestern Bell Telephone	-	-	-	-	-
Pacific Bell	-	-	-	-	-
Nevada Bell	-	-	-	-	-
Southern New England Telephone	-	-	-	-	-
Ameritech	-	-	-	-	-
New Lines					
Southwestern Bell Telephone	-	-	-	-	-
Pacific Bell	-	-	-	-	-
Nevada Bell	-	-	-	-	-
Southern New England Telephone	-	-	-	-	-
Ameritech	-	-	-	-	-
Tandem switches					
Growth of existing switches - trunks					
Southwestern Bell Telephone	25,000	25,000	25,000	25,000	25,000
Pacific Bell	25,000	25,000	25,000	25,000	25,000
Nevada Bell	25,000	25,000	25,000	25,000	25,000
Southern New England Telephone	25,000	25,000	25,000	25,000	25,000
Ameritech	25,000	25,000	25,000	25,000	25,000
New switches					
Southwestern Bell Telephone	-	1	-	1	-
Pacific Bell	-	1	-	1	-
Nevada Bell	-	1	-	1	-
Southern New England Telephone	-	1	-	1	-
Ameritech	-	1	-	1	-
New switches - trunks					
Southwestern Bell Telephone	-	25,000	-	25,000	-
Pacific Bell	-	25,000	-	25,000	-
Nevada Bell	-	25,000	-	25,000	-
Southern New England Telephone	-	25,000	-	25,000	-
Ameritech	-	25,000	-	25,000	-

Integrated Service Digital Networks (ISDN) Lines					
Southwestern Bell Telephone	25,000	25,000	25,000	25,000	25,000
Pacific Bell	25,000	25,000	25,000	25,000	25,000
Nevada Bell	25,000	25,000	25,000	25,000	25,000
Southern New England Telephone	25,000	25,000	25,000	25,000	25,000
Ameritech	25,000	25,000	25,000	25,000	25,000

Beginning In-Service Quantities	
End offices (incl. Remotes)	
Analog lines	15,000,000
Digital lines	1,000,000
Trunks	3,000,000
Tandem switches	
Switches	100
Trunks	1,500,000

Ready

Figure 3.5

Microsoft Excel SICAT ABC 3.0 Vendor Generic 10/16/01

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Worksheet: R76

Input - Vendor B Demand Forecast

Item	Contract Year Quantities				
	1	2	3	4	5
End office switches					
Analog replacements (AESS-R) lines	25,000	25,000	25,000	25,000	25,000
Southwestern Bell Telephone	25,000	25,000	25,000	25,000	25,000
Pacific Bell	25,000	25,000	25,000	25,000	25,000
Nevada Bell	25,000	25,000	25,000	25,000	25,000
Southern New England Telephone	25,000	25,000	25,000	25,000	25,000
Ameritech	25,000	25,000	25,000	25,000	25,000
Growth of existing offices					
Lines					
Southwestern Bell Telephone	25,000	25,000	25,000	25,000	25,000
Pacific Bell	25,000	25,000	25,000	25,000	25,000
Nevada Bell	25,000	25,000	25,000	25,000	25,000
Southern New England Telephone	25,000	25,000	25,000	25,000	25,000
Ameritech	25,000	25,000	25,000	25,000	25,000
Trunks					
Southwestern Bell Telephone	25,000	25,000	25,000	25,000	25,000
Pacific Bell	25,000	25,000	25,000	25,000	25,000
Nevada Bell	25,000	25,000	25,000	25,000	25,000
Southern New England Telephone	25,000	25,000	25,000	25,000	25,000
Ameritech	25,000	25,000	25,000	25,000	25,000
New end offices					
Switches w/ over 10,240 lines					
Southwestern Bell Telephone	-	-	1	-	-
Pacific Bell	-	-	1	-	-
Nevada Bell	-	-	1	-	-
Southern New England Telephone	-	-	1	-	-
Ameritech	-	-	1	-	-
Lines for switches w/ up to 10,240 lines					
Southwestern Bell Telephone	-	-	25,000	-	-
Pacific Bell	-	-	25,000	-	-
Nevada Bell	-	-	25,000	-	-
Southern New England Telephone	-	-	25,000	-	-
Ameritech	-	-	25,000	-	-
Lines for switches w/ over 10,240 lines					
Southwestern Bell Telephone	-	-	25,000	-	-
Pacific Bell	-	-	25,000	-	-
Nevada Bell	-	-	25,000	-	-
Southern New England Telephone	-	-	25,000	-	-
Ameritech	-	-	25,000	-	-
Digital start lines					
Southwestern Bell Telephone	-	-	-	-	-
Pacific Bell	-	-	-	-	-
Nevada Bell	-	-	-	-	-
Southern New England Telephone	-	-	-	-	-
Ameritech	-	-	-	-	-
Digital trunks					
Southwestern Bell Telephone	-	-	-	-	-
Pacific Bell	-	-	-	-	-
Nevada Bell	-	-	-	-	-
Southern New England Telephone	-	-	-	-	-
Ameritech	-	-	-	-	-
Burst lines - SBC Total					
Analog lines	-	-	25,000	-	-
Digital lines	-	-	25,000	-	-
Digital trunks	-	-	25,000	-	-

Item	Contract Year Quantities				
	1	2	3	4	5
Remote switches					
Single Remote Switching Center - S (RSCS) switches					
Southwestern Bell Telephone	-	-	-	-	-
Pacific Bell	-	-	-	-	-
Nevada Bell	-	-	-	-	-
Southern New England Telephone	-	-	-	-	-
Ameritech	-	-	-	-	-
Dual Remote Switching Center - S (RSCS) switches					
Southwestern Bell Telephone	-	-	-	-	-
Pacific Bell	-	-	-	-	-
Nevada Bell	-	-	-	-	-
Southern New England Telephone	-	-	-	-	-
Ameritech	-	-	-	-	-
Growth lines					
Southwestern Bell Telephone	-	-	-	-	-
Pacific Bell	-	-	-	-	-
Nevada Bell	-	-	-	-	-
Southern New England Telephone	-	-	-	-	-
Ameritech	-	-	-	-	-
New remote lines					
Southwestern Bell Telephone	-	-	-	-	-
Pacific Bell	-	-	-	-	-
Nevada Bell	-	-	-	-	-
Southern New England Telephone	-	-	-	-	-
Ameritech	-	-	-	-	-
Tandem switches					
Growth of existing switches - trunks					
Southwestern Bell Telephone	25,000	25,000	25,000	25,000	25,000
Pacific Bell	25,000	25,000	25,000	25,000	25,000
Nevada Bell	25,000	25,000	25,000	25,000	25,000
Southern New England Telephone	25,000	25,000	25,000	25,000	25,000
Ameritech	25,000	25,000	25,000	25,000	25,000
New switches					
Southwestern Bell Telephone	-	1	-	1	-
Pacific Bell	-	1	-	1	-
Nevada Bell	-	1	-	1	-
Southern New England Telephone	-	1	-	1	-
Ameritech	-	1	-	1	-
New switches - trunks					
Southwestern Bell Telephone	-	25,000	-	25,000	-
Pacific Bell	-	25,000	-	25,000	-
Nevada Bell	-	25,000	-	25,000	-
Southern New England Telephone	-	25,000	-	25,000	-
Ameritech	-	25,000	-	25,000	-

Integrated Services Digital Network (ISDN) Lines					
Southwestern Bell Telephone	25,000	25,000	25,000	25,000	25,000
Pacific Bell	25,000	25,000	25,000	25,000	25,000
Nevada Bell	25,000	25,000	25,000	25,000	25,000
Southern New England Telephone	25,000	25,000	25,000	25,000	25,000
Ameritech	25,000	25,000	25,000	25,000	25,000

Expanded Subscriber Modules (ESMAs)	
Total	100
Initial Commitment	100
Additional Commitment	0

Beginning In Service Quantities	
End offices	
Analog lines	15,000,000
Digital lines	1,000,000
Trunks	3,000,000
Remote switches	
Analog lines	1,000,000
Digital lines	800,000
Tandem switches	
Switches	1,500,000
Trunks	1,500,000

Ready

Figure 3.6

Microsoft Excel - SICAT - ABL 3.0 Vendor Generic 10.16.01

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Forecasts of demand are provided for each SBC operating company. SICAT totals these forecasts and uses the company-wide demand in developing the switch bills of costs. Quantities are at contract year-end. A contract year runs from *****.

Vendor A demand forecasts.

- Annual line additions are provided for 1A ESS replacements, growth in existing switches, new switches and buyouts of capacity, ready but not yet in service. Growth trunk additions and buyout trunks are separately forecast. Replacement and new trunks will be computed from the line additions based on the line to trunk ratio.
- The forecast also includes any new switches expected during the planning period. In the example, there are no Vendor A remote additions.
- Also note there is no separate digital line forecast for switch replacements, growth or new switches. Analog and digital lines are included in the forecast shown. SICAT applies the proportions of analog and digital lines at the beginning of the planning period to line additions to derive analog and digital lines. The only digital lines explicitly identified in the Vendor A forecast are for buyout lines.
- Similar forecasts are required for growth in existing tandem trunks and new tandem switches and trunks.
- Finally, the Vendor A forecasts include annual quantities of ISDN line additions and beginning in-service quantities. The ISDN line additions are required in the feature investment bill of costs. Beginning in-service quantities are used in apportioning network upgrade and software costs between the installed base of lines and future line additions.

Vendor B demand forecasts.

The demand forecast requirements for Vendor B switches are basically the same as those for Vendor A. It should be noted that the replacement, growth and new line additions are for both analog and digital lines. SICAT applies the proportions of analog and digital lines at the beginning of the planning period to line additions to derive analog and digital lines.

Vendor C demand forecasts.

The demand forecast requirements for Vendor C switches are basically the same as those for Vendor A and Vendor B. However, SICAT does not require Vendor C tandem or remote data.

3.2 SICAT Output

SICAT provides nine switching system *unit investments* for each of the vendors. In addition, average unit investments are computed based upon vendor equipment weightings specific to a state. These results are illustrated in Figure 3.7.

Figure 3.7

Microsoft Excel - SICAT - ABT 3.0 Vendor Engine - 10.16.01																																									
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1	SICAT Output				Illinois			10/16/01																																	
2	Switching System Engineered, Furnished & Installed Costs																																								
3																																									
4																																									
5	Unit Switching Costs																																								
6	End office (remote & remote switches)																																								
7	Line costs / line																																								
8	Analog																																								
9	Digital																																								
10	Average of analog & digital																																								
11	Trunk costs																																								
12	Per OSO trunk																																								
13	Per average line																																								
14	CCS costs																																								
15	Per CCS																																								
16	Per average line																																								
17	Features cost / line																																								
18																																									
19	Tandem switch																																								
20	Tandem costs / trunk																																								
21																																									
22																																									
23	Input Statistics																																								
24	Cost of Carriage																																								
25																																									
26	Fill Factors																																								
27	Analog Lines																																								
28	Digital Lines																																								
29	EO Digital Trunks																																								
30	Tandem Digital Trunks																																								
31	Vendor equipment weighting																																								
32	Lines																																								
33	End office trunks																																								
34	Tandem trunks																																								
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37	Linear																																								
38	Lucient Mtd %																																								
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40	Siemens Mtd %																																								
41	Trunkline																																								
42	Lucient Mtd %																																								
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44	Siemens Mtd %																																								
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- *Analog and digital costs per line* are the amounts of switch investment attributable to terminating access lines. The investments are used in developing wholesale prices for switch ports and in computing the costs of retail services

requiring line terminations, such local telephone services. An *average cost for analog and digital lines* also is provided.

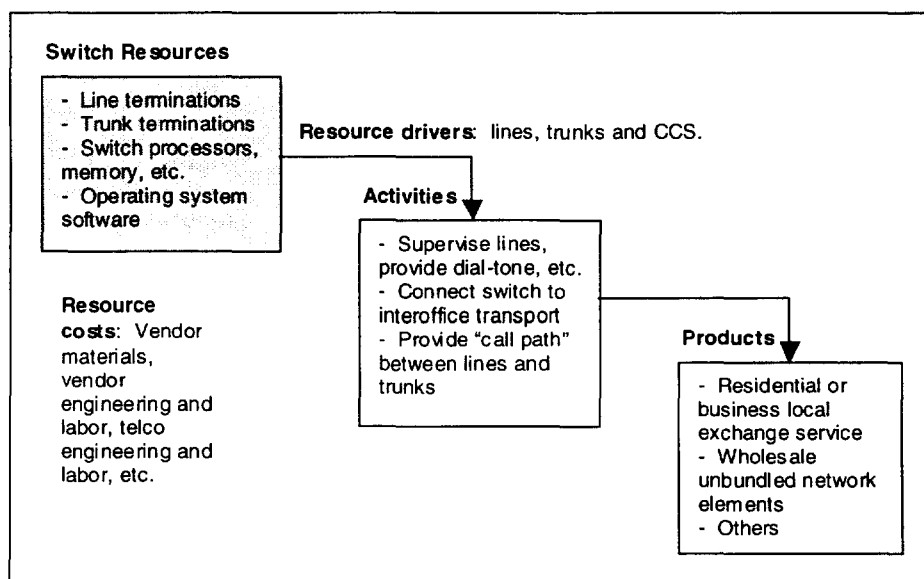
- *End office trunk costs per trunk and average line* represent the portion of switching investment attributable to trunk equipment providing interoffice transport. End office trunk investments are used in cost studies for retail services requiring switched, interoffice transport. These include local telephone services, toll and 800 services and others.
- *CCS costs per CCS and average line* represent the switching system investment attributable to processing call attempts and providing call paths among lines and trunks. The investment per CCS is used in all cost studies for retail services requiring end office and remote switch usage.
- *Feature costs per line* are the capitalized costs of feature right-to-use fees expressed per line.
- *Tandem costs per trunk* equal the forward-looking investment in tandem switching per trunk. Tandem investments are used in wholesale and retail product cost studies in which transport via tandem switches is required. This includes local services, toll and 800 services and others.

4.0 Description of SICAT Methodology

SICAT computes switch unit investments using *activity-based costing*.¹² The tool also reflects *forward-looking, incremental costs*.

Activity-based costing or ABC measures the costs of products by identifying the business activities necessary to provide products and determining the cost of these activities. Activity costs are measured based on the resources consumed in performing activities and the costs of the resources. Resources include plant, labor, etc. The ABC approach as it relates to switching systems is illustrated in Figure 4.1.

Figure 4.1



A product, such as residential local exchange service, requires certain activities performed by end office and tandem switching systems. These include supervising lines to detect call attempts, providing dial tone, connecting lines to other lines and trunks, etc. A switch consists of line terminating equipment, trunk equipment, processors and other resources that enable these activities or functions to be performed. As switch functions are performed resource capacity is consumed. There is a direct relationship between a product and switch resources consumed.

¹² Activity-based costing is a common cost accounting technique used in the telecommunications and other industries for product costing and cost management.

Switch resources, of course, have costs, including vendor EF&I charges, telco engineering and labor costs and others. When expressed as costs per unit of capacity, costs are attributable to activities and products that consume them.

SICAT focuses on the shaded box shown in Figure 4.1. The following sections describe the methods for computing unit investments per line, trunk, etc.

4.1 Bills of Costs

Switching costs are calculated in a series of “bills of costs,” similar to a bill a consumer or business receives for purchased goods or services. The bill of costs summarizes vendor contract items, prices, quantities, and total costs each year of the planning period. Costs are summarized on separate bills for lines, trunks, call, and feature usage. Separate bills are provided for each vendor. The bills of costs also capture the costs of major hardware and software upgrades during the planning period necessary to keep switching systems up-to-date.

4.1.1 Investment Per Analog Line

Figure 4.2 shows the bill of cost for the Vendor A analog line. Vendor price and demand forecast data are from SICAT Input spreadsheets. The bill tallies all EF&I charges associated with analog line additions over the planning period, and then computes the unit investment by dividing total EF&I costs by total analog lines. The bill also removes trunk and usage costs from the analog line charges.

The first column of the bill lists the switch resources SBC obtains from the vendor to provide for switch replacements, growth and new switches. These include access interface units, replacement and conversion services and others. These are identified in the switch contracts between SBC and the vendor. A resource driver is specified for each item. This is a measure of the quantity of the item to be purchased. The measure is defined in terms of the units actually specified in the vendor contract.

In the third column EF&I prices are shown. The values are taken from the Inputs – EF&I spreadsheet. They can be referenced to the vendor contract, as necessary.

The next five columns are the annual quantities of each contract item to be purchased. The values are the sum of the SBC regional quantities entered on the Input – Demand spreadsheets. These are the plant additions forecast by SBC’s procurement organization at the time vendor contracts were negotiated. They are the same switch volumes used by the vendor in setting prices.

Figure 4.2

Microsoft Excel - SI-CAT - ABC 3.0 Vendor Generic 10.16.01														
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Bill of Costs														
Vendor A Technologies														
Analog line														
	Resource	Resource	EF&I	Contract Year Quantity					Total Cost					
	Driver	Price		1	2	3	4	5	1	2	3	4	5	
End office switch														
Analog replacement (AESS-R)														
10	AUI line - new up to 9 16 CCS (ABS)	Lines	\$ 200.00	117,188	117,188	117,188	117,188	117,188	\$ 23,437,500	\$ 23,437,500	\$ 23,437,500	\$ 23,437,500	\$ 23,437,500	
11	711 Connector Y - splice	Splices	\$ 5.00	117,188	117,188	117,188	117,188	117,188	\$ 585,938	\$ 585,938	\$ 585,938	\$ 585,938	\$ 585,938	
12	Central office termination	Lines	\$ 5.00	117,188	117,188	117,188	117,188	117,188	\$ 585,938	\$ 585,938	\$ 585,938	\$ 585,938	\$ 585,938	
Conversion services														
13	Board to board	Lines	\$ 5.00	117,188	117,188	117,188	117,188	117,188	\$ 585,938	\$ 585,938	\$ 585,938	\$ 585,938	\$ 585,938	
14	LDWAP / CORC	Lines	\$ 5.00	117,188	117,188	117,188	117,188	117,188	\$ 585,938	\$ 585,938	\$ 585,938	\$ 585,938	\$ 585,938	
15	CAS	Lines	\$ 5.00	117,188	117,188	117,188	117,188	117,188	\$ 585,938	\$ 585,938	\$ 585,938	\$ 585,938	\$ 585,938	
Growth of existing office														
16	AUI line - new up to 9 16 CCS (ABS)	Lines	\$ 200.00	117,188	117,188	117,188	117,188	117,188	\$ 23,437,500	\$ 23,437,500	\$ 23,437,500	\$ 23,437,500	\$ 23,437,500	
New end office (SESS)														
17	Base host	Hosts	\$ 100,000	0	0	4.69	0	0	\$ -	\$ -	\$ 468,750	\$ -	\$ -	
18	AUI line - new up to 9 16 CCS (ABS)	Lines	\$ 200.00	0	0	164,063	0	0	\$ -	\$ -	\$ 32,812,500	\$ -	\$ -	
Buyouts														
19	Analog line	Lines	\$ 200.00	0	0	25,000	0	0	\$ -	\$ -	\$ 5,000,000	\$ -	\$ -	
20	Subtotal - EO analog lines (including trunk & CCS costs)								\$ 49,804,688	\$ 49,804,688	\$ 88,085,938	\$ 49,804,688	\$ 49,804,688	
Trunks														
21	Analog replacement (AESS-R)	Trunks	\$ (200.00)	11,719	11,719	11,719	11,719	11,719	\$ (2,343,750)	\$ (2,343,750)	\$ (2,343,750)	\$ (2,343,750)	\$ (2,343,750)	
22	New end office (SESS)	Trunks	\$ (200.00)	0	0	16,406	0	0	\$ -	\$ -	\$ (3,281,250)	\$ -	\$ -	
CCS														
23	Analog replacement (AESS-R)	CCS	\$ (16.34)	1,075,781	1,075,781	1,075,781	1,075,781	1,075,781	\$ (17,578,125)	\$ (17,578,125)	\$ (17,578,125)	\$ (17,578,125)	\$ (17,578,125)	
24	Growth of existing office	CCS	\$ -	1,075,781	1,075,781	1,075,781	1,075,781	1,075,781	\$ -	\$ -	\$ -	\$ -	\$ -	
25	New end office (SESS)	CCS	\$ -	0	0	1,506,094	0	0	\$ -	\$ -	\$ -	\$ -	\$ -	
26	Buyouts	CCS	\$ (16.34)	0	0	229,500	0	0	\$ -	\$ -	\$ (3,750,000)	\$ -	\$ -	
27	Subtotal - End office trunk & CCS costs								\$ (19,921,875)	\$ (19,921,875)	\$ (26,953,125)	\$ (19,921,875)	\$ (19,921,875)	
Remote switch														
28	Growth-analog line	Lines	\$ 200.00	0	0	0	0	0	\$ -	\$ -	\$ -	\$ -	\$ -	
New EXM														
29	EXM - base	EXMs	\$ 100,000	0	0	0	0	0	\$ -	\$ -	\$ -	\$ -	\$ -	
30	EXM - line	Lines	\$ 200.00	0	0	0	0	0	\$ -	\$ -	\$ -	\$ -	\$ -	
31	Trunks	Trunks	\$ (200.00)	0	0	0	0	0	\$ -	\$ -	\$ -	\$ -	\$ -	
CCS														
32	Growth	CCS	\$ -	0	0	0	0	0	\$ -	\$ -	\$ -	\$ -	\$ -	
33	New remotes	CCS	\$ -	0	0	0	0	0	\$ -	\$ -	\$ -	\$ -	\$ -	
34	Subtotal - remote switch costs								\$ -	\$ -	\$ -	\$ -	\$ -	
Total volume-sensitive costs														
35	Network upgrades & software								\$ 29,882,813	\$ 29,882,813	\$ 61,132,813	\$ 29,882,813	\$ 29,882,813	
36	Total analog line EF&I costs								\$ 17,096	\$ 17,096	\$ 17,096	\$ 17,096	\$ 17,096	
37									\$ 29,899,908	\$ 29,899,908	\$ 61,149,908	\$ 29,899,908	\$ 29,899,908	
Analog line capacity														
38	F&I Factor		95%	234,375	234,375	423,438	234,375	234,375						
39	Analog lines - usable capacity or lines in service			222,656	222,656	402,266	222,656	222,656						
Present value factors														
40	Present values			0.913	0.761	0.634	0.528	0.440						
Total analog line EF&I costs														
41	Analog lines								\$ 27,294,757	\$ 22,745,631	\$ 38,765,259	\$ 15,795,577	\$ 13,162,981	
42									203,256	169,380	255,012	117,625	96,021	
EF&I cost / analog line														
43				\$ 139.65										
Ready														

Some volume quantities, such as lines and new host and remote switches, are SICAT input values. Others are derived values based on cost drivers in the Input – Cost Drivers spreadsheet. For example, the number of Y-splices is calculated by applying 0 to the number of replacement lines. The number of replacement trunks is the line quantity divided by a 0:0 line to trunk ratio. Algorithms for computing annual contract item quantities are contained in cells of the spreadsheet.

It is important to note that the annual quantities represent total capacities to be purchased from the vendor. They are not engineered fills or in-service amounts. An adjustment is made at the bottom of the bill of costs to compute these quantities.

In the last five columns EF&I prices are applied to the annual resource quantities to compute total annual EF&I charges. About midway down the bill of costs, annual charges are summed *before removal of trunk and CCS costs*. These are amounts actually to be paid to the vendor. The charges cover not only switch line terminating equipment, but also trunks and switch usage-driven equipment. These costs must be removed to identify only switch costs attributable to line terminations.

In the next section of the bill, trunk costs implicit in the line charges are computed. This is done by applying the appropriate price per trunk to the quantities of trunks for replacement and new switches. Since growth trunks are separately priced (and not covered by growth line charges), it is not necessary to remove growth trunk costs from the line EF&I charge.

Following the trunk cost adjustment are adjustments to remove switch costs for usage-related equipment. An incremental switch cost per CCS is applied to the CCS capacity provided by line additions each year of the planning period. The CCS cost is derived on the CCS Investment spreadsheet and is described in Section 4.2. The CCS capacity figures equal the product of line additions and the amount of usage or CCS for switches configured for a basic level of usage. For Vendor A, the basic usage level is 9.18 CCS per line.

After these adjustments, analog line EF&I charges are totaled for end office and remote switches. To this point, all costs are sensitive to volume forecasts. In the next step, the portion of volume insensitive, network upgrade and software costs are added. The amount attributed to analog lines is computed at the bottom of the LU Bill of Costs spreadsheet. The calculations are shown in Figure 4.3.

Network upgrade and software costs are summarized by year of the planning period. The costs are apportioned between the installed base of lines in service at the beginning of the planning period and future line additions. Then, upgrade costs attributed to future line additions are assigned to lines, trunks, CCS and features in proportion to their volume sensitive costs. In the example, 0% of lines are future additions, and 0% of volume sensitive switch costs are attributable to analog lines. Therefore, ten percent of upgrade costs are assigned to analog lines.

Figure 4.3

Microsoft Excel - SUCAT ABC 3.0 Vendor Generic 10.16.01														
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	A	B	C	D	E	F	G	H	I	J	K	L	M	N
232	Network Upgrades and Software													
233		Resource	EF&I	Contract Year Quantity					Total Cost					
234		Driver	Price	1	2	3	4	5	1	2	3	4	5	
235		BC2 - 3B21, CM1/2 & DLN30 Hardware	Lol						\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	
236		BC1 - Peripheral Processor Hardware	Lol						\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	
237		IB3 - Generic Hardware	Lol						\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	
238		IVB1 - Generic Operating Software Upgrades	Lol						\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	
239		IVB1 - Generic Application Software Upgrades	Lol						\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	
240		SNET Technology Upgrades	Lol						\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	
241		DLN30 Software Licenses	Lol						\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	
242		Discounts	Lol						\$ (100,000)	\$ (100,000)	\$ (100,000)	\$ (100,000)	\$ (100,000)	
243		Remote Upgrades	Each \$ 50,000						\$ -	\$ -	\$ -	\$ -	\$ -	
244		SNET Generic Hardware Upgrades	Lol						\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	
245		AIT Generic Hardware Upgrades	Lol						\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	
246		Total							\$ 800,000	\$ 800,000	\$ 800,000	\$ 800,000	\$ 800,000	
247														
248		Assignment of network upgrades / software costs to line additions							\$ 43,211	\$ 43,211	\$ 43,211	\$ 43,211	\$ 43,211	
249		Assignment of line addition costs												
250		Analog lines							\$ 17,096	\$ 17,096	\$ 17,096	\$ 17,096	\$ 17,096	
251		Digital lines							\$ 1,814	\$ 1,814	\$ 1,814	\$ 1,814	\$ 1,814	
252		CCS							\$ 9,054	\$ 9,054	\$ 9,054	\$ 9,054	\$ 9,054	
253		End office trunks							\$ 13,773	\$ 13,773	\$ 13,773	\$ 13,773	\$ 13,773	
254		Features							\$ 1,474	\$ 1,474	\$ 1,474	\$ 1,474	\$ 1,474	
255														
256														
257		Lines in service - beginning of contract period	16,000,000											
258		PV(analog & digital line additions)	913,567											
259		Total digital lines in service	16,913,567											
260		Percent line additions to total	5%											
261														
262														
263			PV Total											
264			Volume											
265			Sensitive											
266			Costs - \$000											
267		Analog lines	\$ 117,708	40%										
268		Digital lines	\$ 12,492	4%										
269		CCS	\$ 62,341	21%										
270		End office trunks	\$ 94,829	32%										
271		Features	\$ 10,150	3%										
272		Total	\$ 297,521	100%										
273														
274														
275														
276														
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Input - BFM Prices Input - Upgrade Costs Input - VA Demand Input - VB Demand Input - VC Demand CCS Investment VA Bills of Costs VB Bills of Costs VC Bills of Costs Output														
Research														

Returning to the bill of costs, the next step is to compute the present value of the total analog line costs and the present value of analog line additions. First, line additions must be adjusted for spare capacity.

If a marginal cost per line is to be computed, the fill factor is set at engineering fill. In the example, engineering fill of 0% for analog line terminating equipment is used. If an average EF&I cost per line is to be computed, the fill factor is set at the forward-looking average utilization. The fill factor is applied to analog line capacity to determine the usable capacity of analog lines.

In the last step, the bill of costs computes the EF&I cost per analog line by dividing the sum of the present values of annual costs by the sum of the present values of analog lines. This completes the calculations for the Vendor A analog line unit investment. The bills of costs for Vendor B and Vendor C analog lines are similar to that of Vendor A.

4.1.2 Investment Per Digital Line

Figure 4.4 shows the bill of costs for the Vendor A digital line. The layout is the same as analog lines. Note that the key contract item for the Vendor A digital line is the Integrated Digital Carrier Unit (IDCU). This device provides an integrated DS1 termination on the switch. The quantities of IDCUs are computed by dividing the growth digital line forecast by the DS0s per DS1 ratio in the Input – Cost Drivers spreadsheet. This determines the number of IDCUs to be purchased for growth in digital lines during the planning period. The bills of costs for Vendor B and Vendor C analog lines are similar to that of Vendor A.

Figure 4.4

Microsoft Excel - ABC 3.0 Vending Machine 10.16.01														
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	A	B	C	D	E	F	G	H	I	J	K	L	M	N
91	Digital Line													
92		Resource	Resource	EFBI	Contract Year Quantity					Total Cost				
93		Driver	Price		1	2	3	4	5	1	2	3	4	5
94	End office switch													
95		Analog replacement (AESS-R)												
96		DCUs TR303	DCUs \$ 5,000.00	326	326	326	326	326	\$ 1,627,604	\$ 1,627,604	\$ 1,627,604	\$ 1,627,604	\$ 1,627,604	\$ 1,627,604
97		711 Connector Y - splice	Splices \$ 5.00	7,813	7,813	7,813	7,813	7,813	\$ 39,063	\$ 39,063	\$ 39,063	\$ 39,063	\$ 39,063	\$ 39,063
98		Central office termination	Lines \$ 5.00	7,813	7,813	7,813	7,813	7,813	\$ 39,063	\$ 39,063	\$ 39,063	\$ 39,063	\$ 39,063	\$ 39,063
99		Conversion services												
100		Board to board	Lines \$ 5.00	7,813	7,813	7,813	7,813	7,813	\$ 39,063	\$ 39,063	\$ 39,063	\$ 39,063	\$ 39,063	\$ 39,063
101		LOWAP / CORC	Lines \$ 5.00	7,813	7,813	7,813	7,813	7,813	\$ 39,063	\$ 39,063	\$ 39,063	\$ 39,063	\$ 39,063	\$ 39,063
102		CAS	Lines \$ 5.00	7,813	7,813	7,813	7,813	7,813	\$ 39,063	\$ 39,063	\$ 39,063	\$ 39,063	\$ 39,063	\$ 39,063
103		Growth of existing office												
104		DCUs TR303	DCUs \$ 5,000.00	326	326	326	326	326	\$ 1,627,604	\$ 1,627,604	\$ 1,627,604	\$ 1,627,604	\$ 1,627,604	\$ 1,627,604
105		New end office (SESS)												
106		Base host	Hosts \$ 100,000	0	0	0.31	0	0	\$ -	\$ -	\$ 31,250	\$ -	\$ -	\$ -
107		DCUs TR303	DCUs \$ 5,000.00	0	0	456	0	0	\$ -	\$ -	\$ 2,278,646	\$ -	\$ -	\$ -
108		Buyouts												
109		Digital line	Lines \$ 200.00	0	0	25,000	0	0	\$ -	\$ -	\$ 5,000,000	\$ -	\$ -	\$ -
110		Subtotal - EO analog lines (including trunk & CCS costs)												
111									\$ 3,450,521	\$ 3,450,521	\$ 10,760,417	\$ 3,450,521	\$ 3,450,521	\$ 3,450,521
112		Trunks												
113		Analog replacement (AESS-R)												
114		Trunks	Trunks \$ (200.00)	781	781	781	781	781	\$ (156,250)	\$ (156,250)	\$ (156,250)	\$ (156,250)	\$ (156,250)	\$ (156,250)
115		New end office (SESS)												
116		Trunks	Trunks \$ (200.00)	0	0	1,094	0	0	\$ -	\$ -	\$ (218,750)	\$ -	\$ -	\$ -
117		CCS												
118		Analog replacement (AESS-R)	CCS \$ (16.34)	7,813	7,813	7,813	7,813	7,813	\$ (127,655)	\$ (127,655)	\$ (127,655)	\$ (127,655)	\$ (127,655)	\$ (127,655)
119		Growth of existing office	CCS \$ -	71,719	71,719	71,719	71,719	71,719	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
120		New end office (SESS)	CCS \$ -	0	0	100,406	0	0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
121		Buyouts	CCS \$ (16.34)	0	0	229,500	0	0	\$ -	\$ -	\$ (3,750,000)	\$ -	\$ -	\$ -
122		Subtotal - End office trunk & CCS costs												
123									\$ (283,905)	\$ (283,905)	\$ (4,252,655)	\$ (283,905)	\$ (283,905)	\$ (283,905)
124		Remote switch												
125		Growth digital line												
126		Lines	Lines \$ 200.00	0	0	0	0	0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

4.1.3 Average Investment Per Analog and Digital Line

SICAT computes an average investment per line reflecting a blend or weighting of the analog and digital line costs. An abbreviated bill of costs is used for this calculation. The average or blended investment per line is used in cost studies for services in which access is provided via analog and digital lines.

4.1.4 CCS Investment Per Line and Per CCS

Once CCS or usage-related costs have been removed from analog and digital line costs, they are carried to a separate bill of costs where the CCS investment per line and per CCS are calculated. The calculation is straightforward. To convert the investment per CCS to an investment per line, the investment per CCS is multiplied times the basic CCS per line. The Vendor A EF&I costs per CCS and line is shown in Figure 4.5.

Figure 4.5

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Sheet1

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
143	CCS													
144		Resource	Resource	EF&I	Contract Year Quantity					Total Cost				
145		Driver	Price		1	2	3	4	5	1	2	3	4	5
146	Total analog line CCS EF&I costs									\$ 17,578,125	\$ 17,578,125	\$ 21,326,125	\$ 17,578,125	\$ 17,578,125
147	Total digital line CCS EF&I costs									\$ -	\$ -	\$ 3,750,000	\$ -	\$ -
148	Total volume-sensitive costs									\$ 17,578,125	\$ 17,578,125	\$ 25,076,125	\$ 17,578,125	\$ 17,578,125
149	Network upgrade & software									\$ 9,054	\$ 9,054	\$ 9,054	\$ 9,054	\$ 9,054
150	Total CCS EF&I costs									\$ 17,587,179	\$ 17,587,179	\$ 25,085,179	\$ 17,587,179	\$ 17,587,179
151	Analog line CCS				2,151,563	2,151,563	3,887,156	2,151,563	2,151,563					
152	Digital line CCS				71,719	71,719	301,219	71,719	71,719					
153	Total CCS				2,223,281	2,223,281	4,188,375	2,223,281	2,223,281					
154	Present value factors				0.913	0.761	0.634	0.526	0.440					
155	Present values													
156	Total CCS EF&I costs									\$16,054,825	\$13,379,021	\$15,903,720	\$9,290,967	\$7,742,469
157	Total CCS									2,029,569	1,691,307	2,655,171	1,174,519	976,766
158	EF&I cost / CCS			\$ 7.31										
159	EF&I cost / analog & digital line			\$ 67.13										

Sheet1: Input - EF&I Prices / Input - Upgrade Costs / Input - VA Demand / Input - VC Demand / Input - VC Demand / CCS Investment / VA Bills of Costs / VC Bills of Costs / VC Bills of Costs / Output

4.1.5 Investment Per End Office Trunk and Tandem Trunk

Figure 4.6 shows the bills of costs for Vendor A end office and tandem trunks. The methodology follows the same approach described for lines and CCS.

Recall that the costs of trunks associated with replacement and new switches were computed on the line bills of costs. These are carried over to the end office trunk bill of cost. Trunk costs are added for growth and buyout trunks. Prices and quantities are obtained directly from the Input spreadsheets.

Next, a share of network upgrade and software costs is added, and annual end office trunk costs are summed. After computing present values for the annual costs and usable trunk capacity (or trunks in service), the EF&I cost per trunk is calculated. This figure is divided by the forward-looking line-to-trunk ratio, which SICAT calculates, to determine the trunk cost per line. The forward-looking line to trunk ratio is different from the line to trunk ratio used to compute replacement and new switch trunks (0.0 vs. 0.0). This is because the line to trunk ratio used to compute replacement and new switch trunks is simply the number of trunks the vendor has implicitly included in the per-line prices. The forward-looking line to trunk ratio determines what the line to trunk ratio will be at the end of contract period by recognizing that SBC does not provision trunks in its switching network at this ratio.

All future tandem trunk additions are either growth additions to existing tandems or for new tandem switches. No replacements are anticipated. Consequently, the Vendor A bill of costs shown in Figure 4.6 includes annual charges for only growth and new trunks. The bill also includes tandem switch upgrade costs.

Tandem trunk costs are computed in the same fashion for Vendor B. Costs are not included for Vendor C, because SBC does not purchase tandem switches from Vendor C.

Figure 4.6

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Resource	Resource Driver	EF&I Price	Contract Year Quantity					Total Cost				
			1	2	3	4	5	1	2	3	4	5
End Office Trunk												
Total EO analog line-driven replacement & new trunk EFM costs								\$ 2,343,750	\$ 2,343,750	\$ 5,625,000	\$ 2,343,750	\$ 2,343,750
Total EO digital line-driven replacement & new trunk EFM costs								\$ -	\$ -	\$ -	\$ -	\$ -
EO growth trunk	Trunks	\$ 200.00	125,000	125,000	125,000	125,000	125,000	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000
EO buyout trunk	Trunks	\$ 200.00	-	-	25,000	-	-	\$ -	\$ -	\$ 5,000,000	\$ -	\$ -
Total volume-sensitive costs								\$ 27,343,750	\$ 27,343,750	\$ 35,625,000	\$ 27,343,750	\$ 27,343,750
Network upgrade & software								\$ 13,773	\$ 13,773	\$ 13,773	\$ 13,773	\$ 13,773
Total end office trunk EF&I costs								\$ 27,357,523	\$ 27,357,523	\$ 35,638,773	\$ 27,357,523	\$ 27,357,523
Total end office trunks			136,719	136,719	178,125	136,719	136,719					
FA Factor		95%										
Trunks - usable capacity or trunks in service			129,883	129,883	169,219	129,883	129,883					
Present value factors			0.913	0.761	0.634	0.526	0.440					
Present values												
Total end office trunk EF&I costs								\$24,973,887	\$20,811,573	\$22,582,777	\$14,452,481	\$12,043,734
Total end office trunks								118,556	98,805	107,274	68,615	57,179
EF&I cost / end office trunk		\$ 218.83										
Forward-looking line to trunk ratio		28.48%										
EF&I trunk cost / analog & digital line		\$ 42.97										
Tandem Trunk												
Growth of existing tandem												
DNLS trunk	Trunks	\$ 200.00	125,000	125,000	125,000	125,000	125,000	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000
New tandem												
DNLS trunk (up to new 92,000 trunks)	Trunks	\$ 200.00	-	125,000	-	125,000	-	\$ -	\$ 25,000,000	\$ -	\$ 25,000,000	\$ -
Upgrade costs (per DS0 trunk)	Trunks	\$ 5.00	125,000	250,000	125,000	250,000	125,000	\$ 625,000	\$ 1,250,000	\$ 625,000	\$ 1,250,000	\$ 625,000
Total tandem trunk EF&I costs								\$ 25,625,000	\$ 51,250,000	\$ 25,625,000	\$ 51,250,000	\$ 25,625,000
Total tandem trunks			125,000	250,000	125,000	250,000	125,000					
FA Factor		95%										
Trunks - usable capacity or trunks in service			118,750	237,500	118,750	237,500	118,750					
Present value factors			0.913	0.761	0.634	0.526	0.440					
Present values												
Total tandem trunk EF&I costs								\$23,392,318	\$38,987,196	\$16,244,665	\$27,074,442	\$11,281,017
Total tandem trunks								108,403	180,672	75,280	125,467	52,278
EF&I cost / tandem trunk		\$ 215.79										

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4.1.6 Feature Investment Per Line

Feature investment represents capitalized right-to-use fees for feature software installed in end office switches. In the past, feature software was purchased by paying annual right-to-use fees (RTU) per line in service. In ***** Vendor A and SBC agreed to end this fee arrangement, and instead SBC would “buyout” remaining RTU fees.

Figure 4.7 shows the calculation of the Vendor A feature investment per line. The RTU fee buyout takes place in the second year of the planning period. Present values and the unit investment are calculated as in other bills of costs. The line quantities in this case include the installed base of lines and line additions, plus ISDN line additions over the planning period. ISDN lines are added, because the feature software also supports ISDN.

The Vendor B and Vendor C bills of costs have similar calculations. They also require ISDN lines to be included in the calculations.

Figure 4.7

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Features	Resource	Resource Driver	EF&I Price	Contract Year Quantity					Total Cost				
				1	2	3	4	5	1	2	3	4	5
Right-to-Use (RTU) buyout fee									\$ -	\$ 200,000	\$ -	\$ -	\$ -
Network upgrade & software									1,474	1,474	1,474	1,474	1,474
Total Features EF&I costs									\$ 1,474	\$ 201,474	\$ 1,474	\$ 1,474	\$ 1,474
Analog lines			222,656	222,656	402,268	222,656	222,656						
Digital lines			14,844	14,844	48,984	14,844	14,844						
ISDN lines			118,750	118,750	118,750	118,750	118,750						
Total line additions			356,250	356,250	570,000	356,250	356,250						
Present value factors			0.913	0.781	0.634	0.528	0.440						
Present values									\$1,346	\$153,267	\$935	\$779	\$549
RTU buyout fee									325,210	271,009	361,345	188,200	156,834
Line additions									16,000,000				
Lines in service - beginning of contract period													
Feature EF&I cost / line			\$ 0.91										

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